

## RECENT LITERATURE

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### KING, D.

- 2007 Some notes on Stirling Range populations of *Ogyris oroetes apiculata* Quick (Lepidoptera: Lycaenidae). *Victorian Entomologist* 37: 81-83.
- 2007 Note on Kelvyn L. Dunn's "An extension to the known distribution of *Eurema alitha* C. & R. Felder) into south-eastern Queensland (Lepidoptera: Pieridae)". *Victorian Entomologist* 37: 84.

### LAMBKIN, C.L., FAYED, S.A., MANCHESTER, C., LA SALLE, J., SCHEFFER, S.J. and YEATES, D.K.

- 2008 Plant hosts and parasitoid associations of leaf mining flies (Diptera: Agromyzidae) in the Canberra region of Australia. *Australian Journal of Entomology* 47(1): 13-19.

### LARSEN, M.L. and WALTER, G.H.

- 2007 Intraspecific variation within *Orosius argentatus* Evans (Hemiptera: Cicadellidae): colour polymorphisms, morphometric analysis and host associations. *Australian Journal of Entomology* 46(3): 207-216.

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- 2008 Significance of a new field oviposition record for *Graphium eurypylus* (L.) (Lepidoptera: Papilionidae) on *Michelia champaca* (Magnoliaceae). *Australian Journal of Entomology* 47(1): 58-63.

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- 2007 Mosquito (Diptera: Culicidae) fauna in inland areas of south-west Western Australia. *Australian Journal of Entomology* 46(1): 60-64.

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- 2007 New taxa of signal flies (Diptera: Platystomatidae) of New Caledonia. *Records of the Australian Museum* 59: 65-77.  
[Includes key to Australasian species]
- 2007 Review of the Borboroidini or wombat flies (Diptera: Heteromyzidae), with reconsideration of the status of families Heleomyzidae and Sphaeroceridae, and descriptions of femoral gland-baskets. *Records of the Australian Museum* 59: 143-219.
- 2007 Australian signal flies of the *Euprosopia megastigma* group (Diptera: Platystomatidae). *Tijdschrift voor Entomologie* 150: 219-235.

### McLEISH, M.J. and CHAPMAN, T.W.

- 2007 The origin of soldiers in the gall-inducing thrips of Australia (Thysanoptera: Phlaeothripidae). *Australian Journal of Entomology* 46(4): 300-304.

### MARRIOTT, P.

- 2006 A rediscovered type *Neumichtis mesophaea* (Hampson, 1906) Lepidoptera Noctuidae. *Victorian Entomologist* 36: 90-91.

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- 2003 New records for Hemiptera species in Western Australia. *Records of the Western Australian Museum* 21: 353-357.

### MOULDS, T.A.

- 2004 Review of Australian cave guano ecosystems with a checklist of guano invertebrates. *Proceedings of the Linnean Society of New South Wales* 125: 1-42.

**REDESCRIPTION OF *PAURODESMUS SJOESTEDTI* (VERHOEFF, 1924), COMB. N. (DIPLOPODA: POLYDESMIDA: DALODESMIDAE)**

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**Abstract**

*Queenslandesmus* Verhoeff, 1924 is newly synonymised with *Paurodesmus* Chamberlin, 1920 and *Paurodesmus sjoestedti* (Verhoeff, 1924), comb. n. is redescribed from new material. The species name *sjoestedti* may be lost to synonymy when males of the possibly conspecific *Paurodesmus acutangulus* Chamberlin, 1920 are recognised. The female holotype of *P. acutangulus* was collected at Kuranda, approximately 50 km outside the currently known range of *P. sjoestedti*.

**Introduction**

Dalodesmidae are moisture loving polydesmidan millipedes with a Gondwanan distribution and high generic and species diversity in Tasmania (Mesibov 2006-07). So far, only three Queensland dalodesmids have been described: *Orthorhachis pallida* Jeekel, 1985, *Paurodesmus acutangulus* Chamberlin, 1920 and *Queenslandesmus sjoestedti* Verhoeff, 1924. *Orthorhachis pallida* was collected in the Bunya Mountains in southeastern Queensland and two congeners are known, both from caves in southern New South Wales (Jeekel 2006). The other two Queensland dalodesmids are in monotypic genera. *P. acutangulus* was described from a single female collected by H.L. Clark at Kuranda, northern Queensland, date unknown. One male and three females of *Q. sjoestedti* were collected by the Mjöberg expedition at 'Cedar Creek, Queensland, April' (Verhoeff 1924, p. 37). Following Ferrier (2006), the collection year was 1913 and 'Cedar Creek' was at or near the present-day Ravenshoe, ca 90 km south of Kuranda.

Five more males of *Q. sjoestedti* have now been found in millipede samples from four sites within 45 km of Ravenshoe and a redescription of this species is given below.

Because the original descriptions of *P. acutangulus* and *Q. sjoestedti* are similar, Jeekel (1981, 1985) suggested that the two genera might be the same. Below, I present evidence that this suggestion is correct and formally place *Queenslandesmus* Verhoeff, 1924 as a junior subjective synonym of *Paurodesmus* Chamberlin, 1920. However, the type locality of *P. acutangulus*, Kuranda, is ca 50 km north of the nearest *Q. sjoestedti* site (Fig. 1), in a region known for its high faunal turnover with distance (Yeates and Monteith, in press). In the absence of male specimens from the Kuranda area, I am reluctant to assert that *P. acutangulus* and *Q. sjoestedti* are conspecific. Nevertheless, there is a good chance that the name *sjoestedti* will eventually be lost to synonymy.

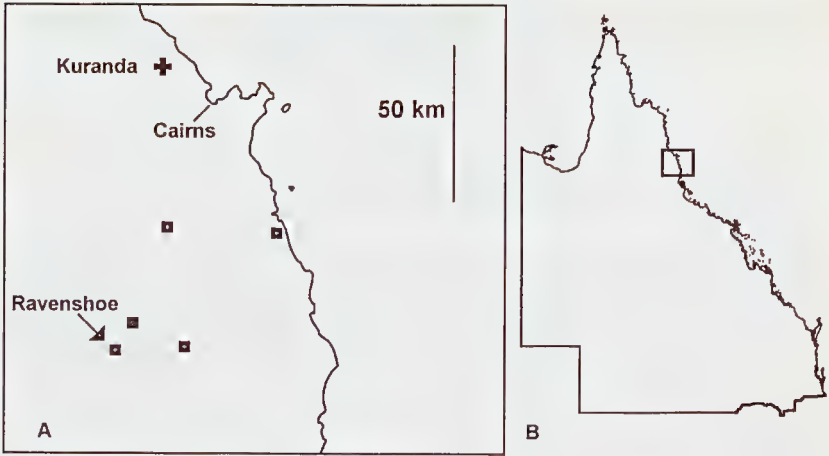


Fig. 1. (A) *P. sjoestedti* localities (squares) and *P. acutangulus* locality (cross) as of 1 September 2007; arrow points to type locality of *P. sjoestedti*. (B) Queensland with rectangle indicating location of map at left.



Fig. 2. Male *P. sjoestedti* from Graham Range (QM S78107). Scale bar = 5 mm.

## Materials and methods

Gonopods were cleared in 60% lactic acid. Air-dried body parts were sputter-coated with gold and examined using an FEI Quanta 600 ESEM operated in high-vacuum mode. Abbreviations: ANIC – Australian National Insect Collection, Canberra; MCZ – Museum of Comparative Zoology, Cambridge, USA; QM – Queensland Museum, Brisbane; ZSM – Zoologische Staatssammlung München, München, Germany.

## Taxonomy

### *Paurodesmus* Chamberlin, 1920

*Paurodesmus* Chamberlin, 1920: 136; Attems, 1940: 490; Jeekel, 1971: 343; Hoffman, 1980: 185; Jeekel, 1981: 52; Jeekel, 1982: 11; Jeekel, 1983: 146; Jeekel, 1985: 51.

*Queenslandesmus* Verhoeff, 1924: 36; Attems, 1926: 146; Verhoeff, 1932: 1580; Verhoeff, 1936: 5-7; Attems, 1940: 384, 454; Jeekel, 1971: 350; Hoffman, 1980: 185; Jeekel, 1981: 52; Jeekel, 1982: 12; Jeekel, 1983: 146; Jeekel, 1985: 50. **New synonymy.**

### *Paurodesmus sjoestedti* (Verhoeff, 1924), **comb. n.**

(Figs 1 (map), 2-5)

*Queenslandesmus sjoestedti* Verhoeff, 1924: 36; pl. 2, fig. 21 (Cedar Creek); Attems, 1940: 454, fig. 645; Jeekel, 1971: 350; Jeekel, 1981: 54; Jeekel, 1985: 50.

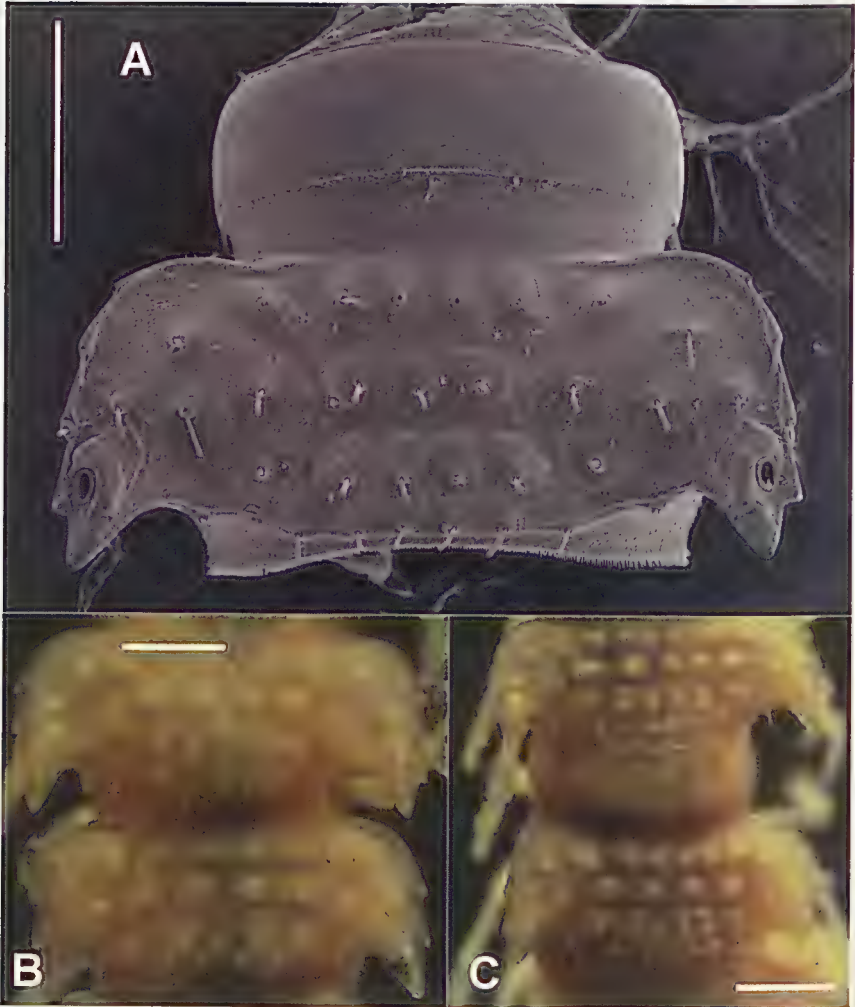
*Syntypes*. QUEENSLAND: 1 ♂, 3 ♀♀, Cedar Creek [Ravenshoe], April [1913], E. Mjöberg *et al.* A male from Cedar Creek identified by K.W. Verhoeff as *Queenslandesmus sjoestedti* is in the Zoologische Staatssammlung München [ZSM], registration number 20052420.00 (SysTax database, <http://www.biologie.uni-ilm.de/systax/daten/index.html>, accessed 10 April 2008). I have not examined this specimen, which is likely to be the male syntype. The location of the three female syntypes is unknown.

*Material examined*. QUEENSLAND: 3 ♂♂, Maalan Road, 2 km S of Palmerston Highway, 17°36'S 145°42'E, 750 m, 18.v.1995, G. Monteith and D. Yeates, pyrethrum, tree bases, S51455; 1 ♂, 1 stadium 6 ♂, Mt Fisher (Kjellberg Road), 17°32'S 145°33'E, 1100 m, 18.v.1995, G. Monteith, pyrethrum, tree bases, S51454; 1 ♂, 1 stadium 6 ♂, Graham Range, 17°17'S 145°58'E, 550 m, G. Monteith, 1.xi.1995, pyrethrum, trees and logs, S78107 (all in QM); 1 ♀, Lake Barrine National Park, 17°16'S 145°39'E, 7.vii.1984, B. Halliday, rainforest, turkey mound, ANIC berlesate 1004, 64-000182, cyphopods everted (in ANIC).

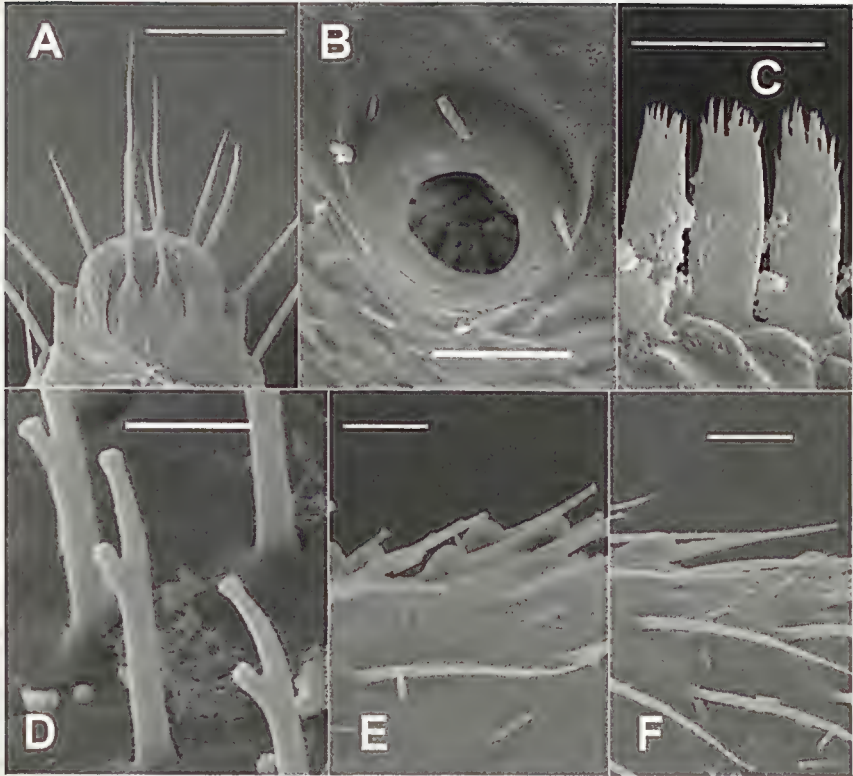
*Description*. Male with head and 19 body segments (Fig. 2). Length *ca* 13 mm, midbody diameter *ca* 1.1 mm. In alcohol, well-coloured specimens light, slightly reddish brown.

Head with sparsely setose vertex and frons; antennal sockets separated by 2x a socket diameter, slightly impressed laterally and ventrally. Antennae (Fig. 5D) long, reaching backwards to ring 5 when extended; antennomere lengths in decreasing order 3>6>2>5>4; antennomere 6 widest.





**Fig. 3.** Midbody rings of *P. sjoestedti* and *P. acutangulus*. (A) SEM dorsal view of ring 10 of male *P. sjoestedti* from Maalan Road (QM S51455). Note sockets for broken-off setae in anterior transverse row of tubercles, at posterior corners of paranota and on swellings medial to ozopores. (B, C) Photomicrographs of midbody rings of the female holotype of *P. acutangulus* from Kuranda (images from MCZ). All scale bars = 0.5 mm.



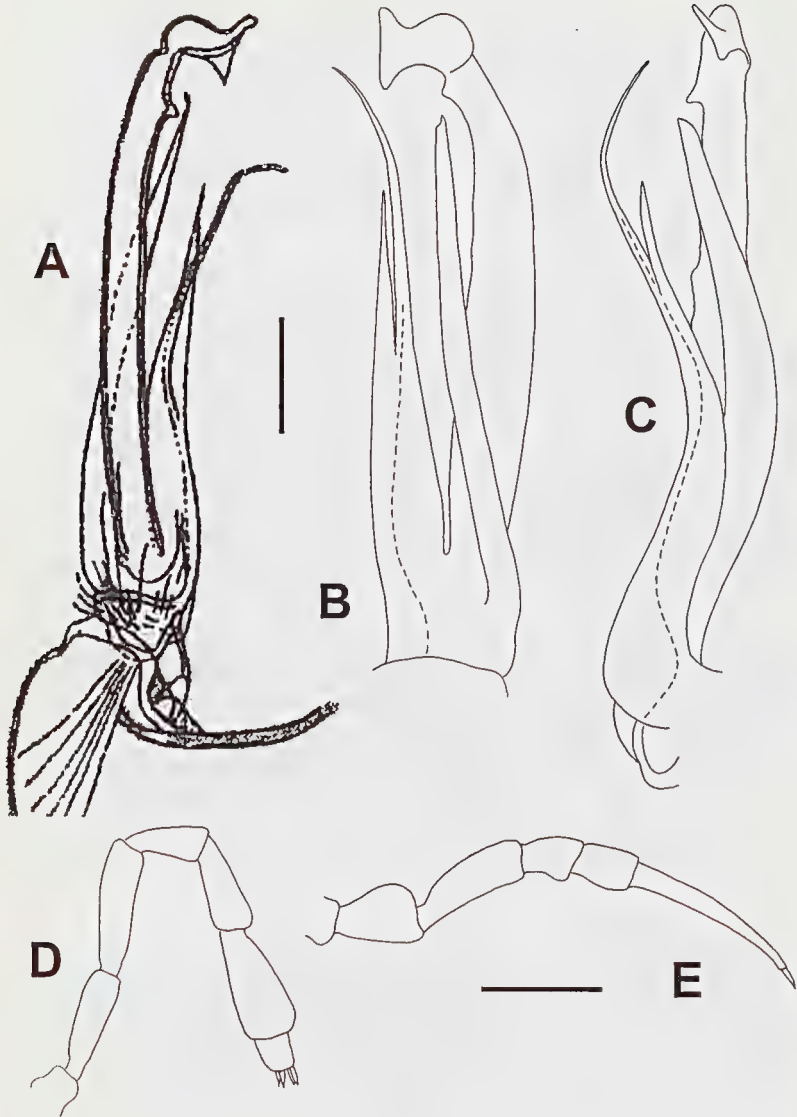
**Fig. 4.** SEM views of male *P. sjoestedti*. (A) ventral view of spinnerets; (B) left posterior spiracle on ring 11, anterior to left; (C) left lateral view of ring 11 limbus, rotated anticlockwise 90°; (D) 'brush' setae on leg 6 femur; (E) sphaerotrichomes with expanded tips on leg 6 postfemur; (F) sphaerotrichome with tapered tip on leg 6 tarsus. (D) specimen from Graham Range (QM S78107), others from Maalan Road (QM S51455). Scale bars (A) = 0.1 mm, (D) = 0.01 mm, others = 0.02 mm.

Collum narrower than head, lenticular in dorsal view, corners slightly rounded. Tergite 2 and tergites 5-15 wider than head, subequal in width; tergites 3 and 4 wider than head but narrower and distinctly shorter than tergites 2 and 5; tergites 16 and 17 narrowing as usual. Waist pronounced, suture well-defined (Fig. 3A), limbus composed of tab-like, irregularly toothed elements (Fig. 4C). Collum and tergites with 3 or 4 transverse rows of tubercles each carrying a stout, blunt, rod-like seta (Fig. 3A). Midbody tergites with procurved anterior row of 8, middle row of 9-10, posterior row of 6 and a posterior marginal row of 8 tubercles; lateral-most tubercle of

anterior row and lateral-most 2 tubercles of middle row located on paranota; lateral-most tubercle of posterior marginal row well separated from median group of 6 (Fig. 3A). Paranota wide, ratio of overall width to prozonite width = 1.6 on midbody ring; margins oblique in lateral view, dipping anteriorly. Paranotum with 3-4 small marginal teeth, the posterior 3 each with a stout, blunt, rod-like seta at the tip. Posterior corner of paranotum strongly produced as blunt triangle projecting posteriorly and very slightly laterally; tip of tooth bearing a stout, blunt, rod-like seta. Pore formula 5, 7, 9, 10, 12, 13, 15-17. Ozopores opening dorsally and laterally at base of posterior paranotal projection, with semicircular cuticular thickening on anterodorsal side; thickening bearing a stout, blunt, rod-like seta at posterior end, at level of 3rd marginal seta. Spiracles small, dome-like, with a small central opening (Fig. 4B); posterior spiracle about halfway between anterior and posterior leg bases on diplosegments. Ring 8 with paired blunt sternal projections between each leg-pair, extending ventrally past adjacent coxae; sternal projections much smaller on ring 9, diminishing posteriorly but still detectable on ring 13. Sternites with weak longitudinal and strong transverse impressions.

Legs (Fig. 5E) slender with long, slightly curved tarsi, anterior prefemora only weakly expanded dorsally; podomere lengths in decreasing order tarsus>femur>prefemur>(postfemur, tibia). 'Brush' setae on basal podomeres with slightly expanded tips and a short, blunt branch arising at slightly more than half the seta length (Fig. 4D). Sphaerotrichomes on postfemur, tibia and tarsus; shaft slightly elevated, tip slightly expanded on postfemur and tibia, shaft tapered and somewhat longer on tarsus (Figs 4E, 4F). Gonopore opening on leg 2 coxa a small, conical, distomedial projection. Hypoproct bluntly triangular. Epiproct bluntly rounded, extending well past anal valves. Spinnerets 4 in square array, the dorsal pair on the rim of a cavity containing the ventral pair (Fig. 4A).

Gonopod aperture quadrangular in ventral view, half the width of ring 7 prozonite; lateral margin slightly raised posteriorly. Telopodites not seen retracted, but long enough to reach legpair 5. Gonocoxae compact, ovoid, lightly joined posteriorly and medially. Telopodite base with shelf-like anterior projection just above gonocoxa and a sparse fringe of setae laterally (Figs 5A-5C). Telopodite split just above base into three major branches: lateral, middle and medial. Lateral branch flattened somewhat lateromedially, tapering very slightly, crossing anterior to the middle branch near its base, extending on the medial side of the middle branch and terminating just posterior to the latter. Middle branch longer and stouter than lateral branch, more or less straight; with a small tooth on posteromedial surface distal to tip of lateral branch; expanding distal to tooth, flattening and curving medially, terminating in two blunt teeth, respectively directed basally and posterodistally. Medial branch of telopodite tapering very strongly, divided at about half its length into a medial spike and a lateral solenomere and curving



**Fig. 5.** *P. sjoestedti*. (A) lateral view of right gonopod of syntype male from Cedar Creek, scanned from Verhoeff (1924, fig. 21). (B) anterior view and (C) medial view of right gonopod; (D) antenna; (E) leg 6 of male from Maalan Road (QM S51455). Scale bar for gonopods = 0.2 mm, for antenna and leg = 0.5 mm. Dashed line in gonopod illustrations indicates course of prostatic groove.



posteriorly at the division; spike extending distally and terminating just below tip of lateral branch; solenomere whip-like, in some preparations curving anteriorly and terminating just distal to tooth on posteromedial surface of middle branch, in other preparations coiled at level of spike tip. Prostatic groove with an anterior loop near base, continuing near posterior surface of medial branch to tip of solenomere.

Female as described for male but very slightly larger; anterior leg prefemora not enlarged. Posterior rim of epigynum only slightly extended. Cyphopods not examined.

*Comments.* The synonymy of *Queenslandesmus* with *Paurodesmus* is based on matching details of the tergites and paranota (Fig. 3), specifically the paranotal form, the number and location of seta-bearing dorsal tubercles and the short, blunt, rod-like form of the setae.

The number of tubercles varies in minor and seemingly irregular ways from ring to ring and specimen to specimen in *P. sjoestedti*. The tubercle numbers given in the redescription apply to most of the midbody rings in the adults examined. Verhoeff (1924) recorded '3+3' per row, referring to the three large tubercles on either side of the dorsal midline; he described the smaller tubercles on the paranota as 'zerstreut', *i.e.* scattered rather than aligned in rows, as reported here.

The brush setae in *P. sjoestedti* differ from those in another dalodesmid with branched brush setae, *Tasmanodesmus hardyi* Chamberlin, 1920 (Mesibov 2004: Fig. 1H). In *T. hardyi* the branching is close to the tip, while in *P. sjoestedti* the branching is at mid-length on the seta. Much more work needs to be done on brush setae and sphaerotrichomes in dalodesmids; neither their range of variation nor their taxonomic value has been adequately explored.

The sternal processes on ring 8 of the male may have a role in mating. There are no corresponding ventral pits on rings 3, 4 or 5 of the Lake Barrine female.

### Acknowledgements

I thank Robert Raven and Owen Seeman (Queensland Museum) for their generous assistance with specimen loans and returns, Karsten Goemann (University of Tasmania) for patient SEM work and Bill Shear for advice on spinnerets. Images of the *P. acutangulus* type were kindly supplied by Laura Leibensperger (MCZ). I am also grateful to the editor and two anonymous referees for helpful comments.

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